

Economic Modeling of Pharmaceuticals and Other Health Interventions

COURSE INFORMATION

30:725:341

2 CREDITS

Fall 2021

Course Instructor:

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Course Assistant:

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Office Hours:

By appointment only; please email instructors in advance to schedule.

Course Date & Time:

Wednesdays ONLINE from 6:30 – 8:30 PM

Course Location:

Internet-based class that meets in the online course classroom once weekly (link to be provided on course website)

Textbooks and Software:**Required Textbook:**

No required textbook.

Additional/Supplemental Readings/Resources:

- Neumann PJ, Sanders GD, Russell LB, Siegel JE, and Ganiats TG (eds). Cost-Effectiveness in Health and Medicine, Second Edition. New York, NY: Oxford University Press, 2017. ISBN: 9780190492969.
- Mauskopf J, Earnshaw SR, Brogan A, Wolowacz S, Brodtkorb TH. Budget-Impact Analysis of Health Care Interventions: A Practical Guide, First Edition. Adis, 2017. ISBN: 9783319844084.
- Gray AM. Applied Methods of Cost-effectiveness Analysis in Health Care, First Edition. New York, NY: Oxford University Press, 2010. ISBN: 9780199227280.
- Briggs A, Claxton K, Sculpher M. Decision Modelling for Health Economic Evaluation, First Edition. New York, NY: Oxford University Press, 2006. ISBN: 9780198526629.
- Additional readings will be posted to the course website as the course progresses

Required Software:

- TreeAge Pro Healthcare, student course license (\$50). Detailed guidance for obtaining this software will be posted to Canvas.
- Students will also be required to enroll in the Remind text messaging system (details to be provided)

Course Description:

Given the controversies about high-cost health care, innovators such as drug, device, and academic scientists are increasingly being called upon by healthcare purchasers to provide evidence demonstrating the financial value of their products and services. Health economic modeling is an established technique for meeting this evidentiary need. This course will cover the principles and methods of economic modeling of pharmaceuticals (i.e., pharmacoeconomic models) and other health improving interventions such as devices, diagnostics, and new models of delivering care, and health promotion programs (e.g., screening; adherence). The application of economic models in the context of healthcare delivery systems will be addressed in terms of how this context

shapes modeling methods. Students will learn how to construct the following types of models: budget impact analysis, decision trees, and Markov population simulation models. Microsoft Excel and TreeAge skills will be used as analytical platforms in which students will run base case models and sensitivity analysis. Application of health economic models in the context of US healthcare decision making such as by pharmacy benefit managers (PBMs), health insurers, and health technology assessment dossiers such as the Association for Managed Care Pharmacy (AMCP) and Institute for Clinical and Economic Review (ICER) will be discussed. Students will also learn to critique models that are published in the scientific literature using guidance such as the Consolidated Health Economic Evaluation Reporting Standards (CHEERS).

Competencies Addressed:

The competencies related to health outcomes, policy, and economics addressed in this course include:

1. Design, evaluate, interpret, and communicate the results of research for applications in health and pharmaceutical outcomes, health economics and health policy research
2. Synthesize evidence for health policy decision makers to facilitate translation of pharmaceutical and other health interventions, applications, or programs
3. Use statistical and business software to analyze pharmaceutical and health outcomes, health care costs, health policy and health economics
4. Work independently and as part of a team to conduct health outcome and economic research projects

Course Objectives:

By the completion of this course, students will be able to:

- Recommend an appropriate type of health economic model based on scientific and policy questions it seeks to answer (Competencies 1, 2, 3, 4)
- Construct health economic models using budget impact, decision analytic, or Markov simulation approaches (Competencies 1, 2, 3, 4)
- Identify appropriate sources of data to inform health economic models based on perspective, time horizon, and model type (Competencies 1, 2, 3)
- Communicate health economic models using published best practices (Competencies 3, 4)

Course Requirements and Grading:

Course grading will be based on two quizzes; one project featuring a budget impact model; one homework featuring a Markov Model; one major project (decision analysis model) with intermediate deliverables, a report, and a presentation; attendance; and class participation in “Modeling Minutes”. Course points are assigned as follows:

Project #1 (Budget Impact Model)	10 pts.
Quiz #1	10 pts.
Quiz #2	10 pts.
Markov modeling homework assignment	10 pts.
Project #2 (Decision Analysis Model) intermediate deliverables	30 pts.
Project #2 presentation	5 pts.
Project #2 report	15 pts.
Attendance	5 pts.
“Modeling Minutes” (includes discussion board post and in-class presentation)	5 pts.
Total:	100 pts.

Attendance will be taken by roll call during each class session. To be considered for an excused absence, the student must email the course coordinator before the start of the missed class. Requests for excused absences will be evaluated on a case-by-case basis by the course coordinator. Supporting documentation is required for

excuse. Students will be granted a maximum of one (1) unexcused absence. After that, points will be deducted as follows:

- 2nd unexcused absence: 2.5 attendance points lost
- 3rd unexcused absence: all attendance points lost

“Modeling Minutes”: each student will be assigned one article relevant to modeling to review. The student must post a summary of the article to the Canvas class discussion board and present the summary in class for a brief discussion. Posts must follow guidelines in Modeling Minutes rubric (available on Canvas in the Discussion Board) in order for full credit to be earned.

Course grades will be earned in accordance with the following Ernest Mario School of Pharmacy scale*:

≥90	A
86 – 89.99	B+
80 – 85.99	B
76 – 79.99	C+
70 – 75.99	C
60 – 69.99	D
<60	F

*Grades will NOT be rounded.

Course Schedule:

DATE (SESSION)	TOPIC	INSTRUCTOR(S)	DEADLINES & ASSESSMENTS
09/01 (1)	Course introduction; Introduction to Pharmacoeconomic Methods and the CHEERS criteria	Pizzi, Prioli	
09/08 (2)	Introduction to Model Structure and Assumptions	Prioli	
09/15 (3)	Understanding Perspectives Taken in Health Economic Models and Impact of COVID-19 on the US Healthcare Marketplace	Pizzi	
09/22 (4)	Budget Impact Models I	Dhanda (guest lecturer)	Quiz #1
09/29 (5)	Budget Impact Models II	Prioli	
10/06 (6)	Decision Analysis I	Pizzi	BIM homework due
10/13 (7)	Decision Analysis II	Pizzi, Prioli	Quiz #2 Decision analytic modeling project - model structure including variable names and payoffs, and table describing base case assumptions due
10/20 (8)	Inflation, Discounting, and Univariate and Probabilistic Sensitivity Analysis	Prioli	Decision analytic modeling project - model populated with cost and probability variables and payoffs, updated table describing assumptions, and rollback results due
10/27(9)	Population Simulation Models (including Markov models)	Jutkowitz (guest lecturer, Asst. Professor at Brown University), Prioli	Quiz #3 Student roundtable question due (minimum 1 question from each student, posted on class discussion board)
11/03 (10)	Discretely Integrated Condition Event (DICE) Modeling; Modeling Roundtable Discussion from	Caro Roundtable Panelists to be Named (invitations in progress)	Decision analytic modeling project - final model, updated assumptions table, and univariate sensitivity analysis results due
11/10 (11)	NO CLASS		Markov modeling homework due
11/17 (12)	NO CLASS		Decision analytic modeling project - paper due
11/24 (13)	NO CLASS (THANKSGIVING BREAK)		
12/01 (14)	Final Project Presentations, Group 1 (Attend this session if the 1st letter of your last name = N through Z)		

12/08 (15)	Final Project Presentations, Group 2 (Attend this session if the 1st letter of your last name = A through M)
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Academic Integrity Policies:

Students are required to be familiar with the university's Policy on Academic Integrity (see <http://academicintegrity.rutgers.edu/academic-integrity-policy/>). Violation of academic integrity is a separable offense under the University Code of Student Conduct. Violations of academic integrity occurring during exams will be either level three or four violations. The recommended sanction for level three violations is suspension from the university for one or more terms with a notation of "academic disciplinary suspension" placed on the student's transcript for the period of suspension and a failing grade in the course. The recommended sanction for level four violations is expulsion from the university and a permanent notation on the student's transcript. Any student who is aware of academic misconduct by another student is obligated to notify a faculty member; failure to do so is also a violation of the Policy on Academic Integrity. Any violations of academic integrity relating to this course will be handled by the student disciplinary process as outlined in the University Code of Student Conduct.

Plagiarism

All student assignments will be scanned by Turnitin, a plagiarism-checking software. Assignments submitted with plagiarism detected will receive zero points, and additional penalty in accordance with the EMSOP academic integrity policy.